

## Foothill Groundwater Basin

- Groundwater Basin Number: 3-53
- County: Santa Barbara
- Surface Area: 3,120 acres (4.9 square miles)

### Basin Boundaries and Hydrology

Foothill Groundwater Basin consists of unconsolidated Pliocene and younger sedimentary deposits underlying the coastal plain near Santa Barbara. The basin is bounded on the north and northeast by Tertiary sedimentary rocks of the Santa Ynez Mountains, on the northwest by the Goleta fault, on the southwest by the Modoc and Mesa faults, on the south by the More Ranch fault, and on the southeast by the Mission Ridge fault. Consolidated marine sedimentary rocks underlie the groundwater basin (Freckleton 1989) and are nearly impermeable except where fractured (Martin and Berenbrock 1986). Precipitation varies across the basin from 17 to 19 inches. All subsequent information is derived from Freckleton (1989) except where noted.

### Hydrogeologic Information

#### ***Water Bearing Formations***

The primary unconsolidated water-bearing deposits are alluvium and the Santa Barbara Formation. It is estimated that the specific yield of saturated materials ranges from 7.5 to 17.5 percent in this basin (Muir 1968). In the unconfined portion of the basin, the average specific yield is estimated to be 9.7 percent (DWR 1999).

**Alluvium.** Holocene age alluvium, which consists of gravel, sand, silt, and clay, extends along the major streams and adjoining canyons. Groundwater in the Holocene age alluvium is generally unconfined. Pleistocene age alluvium, which consists of gravel, sand, silt, and clay, reaches a thickness of 400 feet in the eastern part of the basin. Groundwater in the Pleistocene age alluvium is generally unconfined except along the southernmost margin of the basin.

**Santa Barbara Formation.** The Late Pliocene to Early Pleistocene age Santa Barbara Formation, which is the main water-bearing unit, consists mainly of massive, unconsolidated marine deposits of sand, silt, and clay and ranges to 400 feet thick. It is overlain by alluvium everywhere except where it crops out south of the Goleta fault. Groundwater within the Santa Barbara Formation is generally confined except along the northern margins of the basin.

#### ***Restrictive Structures***

The Modoc, Goleta, More Ranch, Mesa, and Mission Ridge faults act as barriers that impede groundwater flow in and out of the basin. However, the Modoc, Mesa, and Mission Ridge faults are not believed to restrict the flow of groundwater within the unfaulted Holocene alluvial deposits. In the Santa Barbara Formation, groundwater is confined by a zone of low permeability found in the upper part of the formation. The confining zone, which ranges

in thickness from a few feet to more than 100 feet, separates the water-producing zones in the Santa Barbara Formation from the water-bearing units in the overlying alluvium; groundwater is unconfined where the low permeability zone is missing.

### ***Recharge Areas***

Natural recharge in the basin is derived from infiltration of precipitation, seepage from streams, and subsurface inflow from consolidated rocks of the Santa Ynez Mountains. Water imported from Lake Cachuma provides additional recharge. Older alluvium, which is found in large portions of the recharge area, allows infiltration of water into the underlying Santa Barbara Formation.

### ***Groundwater Level Trends***

Groundwater levels declined by more than 60 feet during periods of heavy pumping in the early 1950s, but rose from the mid-1950s through the late 1970s. Increased pumping during 1984 through 1987 likely caused a decline in water levels observed then. Hydrographs show a steady increase in groundwater levels for 1991 through 1996 (DWR 1999). Water levels remained relatively stable during 1996 and 1997, primarily because of the wet winters of 1993 and 1995 (SBCWA 2001). Shallow wells exhibited slight declines during the moderate winters of water years 1998 through 2000, but some deep wells continued to show a rise in water levels (SBCWA 2001) and levels reached historical highs in 2001 (Mack 2001).

### ***Groundwater Storage***

**Groundwater Storage Capacity.** No information is available.

**Groundwater in Storage.** SBCWA (2001) estimated the available usable storage to be 5,000 acre-feet per year for water year 1999 through 2000.

### ***Groundwater Budget (Type A)***

Streamflow recharge is estimated to range from 160 to 460 af/yr. Subsurface inflow is estimated to range from 25 to 300 af/yr. Groundwater pumpage for the Foothill Groundwater Basin ranged from 160 to 2,400 af/yr for the years 1935 through 1987. Groundwater discharge as underflow was estimated to be about 280 af in 1985. The pumpage of the basin is estimated to be 945 af/yr (SBCWA 2001). Recharge from infiltration of precipitation is estimated at 320 af/yr (Muir 1968).

### ***Groundwater Quality***

**Characterization.** SBCWA (2001) cited the total dissolved solid concentrations as ranging from 610 to 1,000 mg/L in 7 wells. Analyses of data from 7 public supply wells show an average TDS of 228 mg/L in the basin with a range from 554 to 1,118 mg/L.

**Impairments.** Two of the wells monitored by USGS in the Foothill Groundwater Basin exceeded the primary MCL of 10 mg/L for nitrate-nitrogen. Nitrate-nitrogen concentration ranged from less than 0.1 to 12 mg/L in wells. High sulfate levels were also found in six wells.

## Water Quality in Public Supply Wells

Constituent Group <sup>1</sup>	Number of wells sampled <sup>2</sup>	Number of wells with a concentration above an MCL <sup>3</sup>
Inorganics – Primary	7	0
Radiological	8	1
Nitrates	7	0
Pesticides	7	0
VOCs and SOCs	7	1
Inorganics – Secondary	7	1

<sup>1</sup> A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).

<sup>2</sup> Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

<sup>3</sup> Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

## Well Production characteristics

Well yields (gal/min)		
Municipal/Irrigation	Range:	Average:
Total depths (ft)		
Domestic	Range: 290 ft.	Average: 290 ft (1 well completion report) (DWR 1999)
Municipal/Irrigation	Range: 500 – 610 ft	Average: 540 ft (3 well completion reports) (DWR 1999)

## Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
City of Santa Barbara	Groundwater levels	
U. S. Geological Survey	Miscellaneous water quality	8 wells
Department of Health Services	Title 22 water quality	7 wells

## Basin Management

Groundwater management:	The City of Santa Barbara manages the basin.
Water agencies	
Public	City of Santa Barbara, Santa Barbara County Water Agency
Private	La Cumbre Mutual Water Company, Sunset Mutual Water Company

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## Errata

Changes made to the basin description will be noted here.